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NORTH PACIFIC OCEAN

By WILLIS EDWIN HURD

There was somewhat less cloudiness over the northern sailing routes of the North Pacific Ocean in October than during the previous several months. Fog also was comparatively infrequent, and was general only on the 2d, 3d, 4th, and 8th. It was observed on 15 days along the American coast between Vancouver and San Diego, with the area of maximum frequency lying between 35° and 40° N.

Little change was evident in the distribution of storminess over that of September, except that gales occurred more often in the American than in the Asiatic area, with the maximum frequency north of the thirtieth parallel along the general region of the Seattle-Honolulu route. No wind forces exceeding 10 were recorded until the last of the month, when two observations of force 11 were made in widely separated areas—one near 48° N., 135° W., on the 28th; the other near 44° N., 157° E., on the 29th. At this time also vessels reported some of the lowest pressures observed in the eastern North Pacific Ocean.

Pressure was abnormally high this month at the three island stations of the central and northern Pacific, which are usually taken as the basis of barometric conditions in their respective neighborhoods. Honolulu's mean of 30.05 inches, with departure from the normal of plus 0.05, was unusually high. At Midway Island the mean p. m. pressure was 30.07, or 0.06 inch above the normal. Here from the 8th to the 26th the departures were strongly positive. At Dutch Harbor observations received for 22 days gave a mean of 29.98, or 0.28 above the normal. There were some rapid and violent fluctuations, as on the 8th, when the pressure dropped to 0.46 inch below normal, and on the 10th, when it rose to 0.67 inch above. During the first 7 and last 4 or 5 days, however, pressure was continuously very high. At Honolulu the highest pressure was 30.18, on the 29th, lowest, 29.88, on the 4th; Midway Island, highest, 30.32, on the 19th, lowest, 29.78, on the 4th; Dutch Harbor, highest, 30.66, on the 5th, lowest, 29.00, on the 15th.

The Aleutian Low was less well developed over southern Bering Sea than during September. After the 8th its principal center, as a rule, lay over the Gulf of Alaska. The lowest land pressure in this region was 28.82, at Kodiak, on the 15th. On the 27th the cyclone center moved considerably southward and for the remainder of the month lay slightly off or over Vancouver. At Juneau the October pressure was 29.64 inches. This reading on the northeast edge of the cyclone showed a departure from the average of -0.23 inch.

The easternmost north Pacific anticyclone was strong and well developed until the 14th, when it was bisected by a southward spread of the Gulf of Alaska cyclone. The high regained its lost area during the 15th, but was again cut in two on the 17th, and by the 20th low pressure was general over the extreme eastern part of the ocean. The high continued as a shallow, irregular belt below latitude 30° or 35° until near the end of the month, when it strengthened and spread northwestward and extended from southern California across the Hawaiian region, thence into Bering Sea.

The weather at Honolulu was windy and cloudy. The average wind velocity, 9.9 miles per hour, was the

highest on record for October; and the maximum velocity, at the rate of 33 miles an hour from the east, was next to the record for the month. Only one previous October, that of 1916, had less sunshine.

In the American tropical area there seems to have been no storm development, though rough, squally weather occurred on several days. The American S. S. *Peter Kerr*, Panama to San Pedro, reported "moderate gales and rain squalls" from 7° 08' N., 81° 12' W., to 15° 27' N., 96° 56' W., on October 12 to 17.

In Asiatic waters several typhoons and depressions occurred, and have received treatment elsewhere in this Review. The only report thus far received by the Weather Bureau from a vessel experiencing one of these typhoons is from the American S. S. *Scottsburg*, Honolulu to Manila, and relates to one of the less intense disturbances mentioned in the report by Father Coronas. Said the observer:

In 13° 57' N., 128° 40' E., at 2 p. m., encountered heavy squall with wind shifting from SE. to SSW., increasing from force 3 to force 6, barometer 29.60. At 4 p. m. barometer 29.54, rainy weather with rough head sea. At midnight wind increased to force 7, with 9 during severe squalls, WSW. barometer 29.58, in 13° 30' N., 26° 45' E.

A fair idea of the brisk air movements over the northern and central routes may be obtained from the adjoined table of gale and storm reports. The gales were mostly associated with the fluctuating activities of the Aleutian Low rather than with progressing cyclones.

An especially interesting report is that of the American schooner *Irene*, Honolulu to Grays Harbor. This vessel weathered a series of gales, force 8 to 10, from the 20th to the 30th of the month, while between positions 31° N., 159° W., and 42° N., 137° W. The roughest weather was met with on the 27th and 28th. To quote from the captain's report:

27th.—About 3 a. m. glass started to fall, wind SE. Glass fell rapidly until 7 a. m., when wind hauled SW., barometer 29.36, wind increasing till about force 10, mountainous seas running. After 10 a. m. glass rising slowly, wind about the same in force until midnight. During the time SW. gale was blowing glass was pumping violently, moving as much as two-tenths in the squalls. Kept this up even after the gale moderated and glass had risen to 30.06. During the most of the gale could feel the difference in pressure on eardrums, so much that some of the men could hardly hear when they got below.

VERY FEW TYPHOONS IN THE FAR EAST DURING SEPTEMBER, 1924

By Rev. JOSÉ CORONAS, S. J.

[Weather Bureau, Manila, P. I.]

Up to the present (September 24) not a single depression or typhoon has occurred during this month over or near the Philippines. Even in the whole Far East we have to mention only one well-developed and intense typhoon over the Loochoos and close to Formosa and a few other depressions of no great importance.

The Formosa typhoon, September 3 to 8.—This typhoon appeared on our weather map of the 3d near 136° longitude E. and 22° latitude N. It moved WNW., and at 6 a. m. of the 5th its center was clearly situated in about 127° longitude E. and 25° latitude N. In the early morning of the 6th, when the center was in about 26° latitude N. and 124° longitude E., the typhoon began to move W. by S., passing very close to north Formosa in the afternoon. The lowest barometric minimum

observed in Formosa was that of Keelung 733.7 mm. (28.89 ins.), with hurricane winds from SW. The maximum velocity of the wind was of 48.3 m. p. s. (108 m.p.h.). The following report was received from the director of Taihoku Observatory:

The typhoon was destructive in north Formosa, causing great damage; persons killed, 18; missing, 14; and injured, 312; houses destroyed, 3,300; partially destroyed, 4,060; damaged, more than 6,000; two steamers and more than 50 junks wrecked.

From 6 a. m. of the 7th the typhoon moved west into China along the 25° latitude N.

Other depressions of less importance.—On the 10th a small cyclonic center was observed to the NE. of Formosa, between 124° and 125° longitude E., 25° and 26° latitude N. It moved NNE. across the Eastern Sea on the 11th and then ENE. across central Japan on the 12th.

Another depression was formed over the Eastern Sea on the 16th to 17th near 30° latitude N., between 126° and 127° longitude E. It moved E. by N. on the 18th and 19th to the south of Japan.

A depression traversed the southern part of Japan on the 16th, moving eastward. It is doubtful whether it really formed over the Eastern Sea ESE. of Shanghai on the 14th, or if it developed out of a low-pressure area shown in our weather maps between Hongkong and Shanghai before the 14th. In the latter case, it should be considered as a continental depression.

THE DESTRUCTIVE TYPHOON OF NORTHERN LUZON, OCTOBER 3, AND FIVE OTHER LESS IMPORTANT TYPHOONS OF THE FAR EAST IN OCTOBER, 1924

By Rev. JOSÉ CORONAS, S. J.

[Weather Bureau, Manila, P. I.]

Both the Pacific and the China Sea were very stormy during the first 8 or 10 days of October. There were three typhoons, which, if not altogether simultaneous during those days, were at least partly so. The most important, however, is that which struck northern Luzon during the night of October 2 to 3 and the morning of the 3d.

Typhoon of northern Luzon, October 3.—This typhoon was shown for the first time in our weather maps on the morning of October 1 about 400 miles to the east of central Luzon near 128° longitude E. and 15° latitude N. It seems to have moved at the beginning NW. by W. and WNW., but gradually inclined more and more to the west, thus threatening the northern part of Luzon. The center traversed Luzon through the central part of Cagayan Province, the northern part of Ilocos Sur, and the southern part of Ilocos Norte. Its actual direction while traversing Luzon was either due west or even perhaps W. by S. Great damage was done not only to the three mentioned Provinces, but also to the Mountain, La Isabela, La Union, and Abra Provinces. It is considered as one of the worst typhoons ever experienced in northern Luzon.

The lowest barometric minima so far reported to our office are: Aparri, 720.63 mm. (28.37 inch.) at 4:30 a. m.; Tuguegarao, 720.90 mm. (28.38 inch.) at 4:51 a. m.; on board S. S. *Macaria*, stranded at 17° 46' latitude N., 120° 24' longitude E., 724.0 mm. (28.50 inch.) at 10 a. m.; Laoag, 726.69 mm. (28.61 inch.) at 8 a. m.; Vigan, 726.16 mm. (28.59 inch.) at 9:30 a. m.

It has been reported that in Lallo, a town 10 miles south of Aparri, the barometer fell to 707.0 mm. (27.59 inch.). In the China Sea the typhoon continued moving almost due W. with a very little inclination to the north.

The positions of the center at 6 a. m. of the 2d to the 6th are as follows:

October 2, 6 a. m., 126° 45' longitude E., 16° 25' latitude N.
October 3, 6 a. m., 121° 15' longitude E., 18° 00' latitude N.
October 4, 6 a. m., 116° 10' longitude E., 17° 55' latitude N.
October 5, 6 a. m., 111° 15' longitude E., 18° 20' latitude N.
October 6, 6 a. m., 107° 20' longitude E., 18° 50' latitude N.

Two Japan typhoons, September 28 to October 9.—On September 28 a depression was formed in the neighborhood of the Loochoos, although it developed into a real typhoon while approaching Japan on the 29th. After moving NE. on the 28th, the typhoon traversed part of Japan and the eastern part of the Japan Sea on the 29th and 30th, moving first NNE., or N. by E., and then NE. At 6 a. m. of October 1 the center was shown by our weather maps not far from the northernmost coast of Japan.

The other Japan typhoon had its origin in the Western Carolines on September 29. The center was situated at 6 a. m. of that day south of Guam and east of Yap near 145° longitude E. and 9° latitude N. It moved northward on September 29 and 30 and October 1; then WNW. on October 2 and 3; and it recurved to N. and NNE. on October 4, when near 130° longitude E. and 19° latitude N. On October 6 it inclined back to WNW. toward the northern part of the Loochoos, but then at about noon of the 7th it recurved again to NE., the center being situated near Kagoshima in the early morning of the 8th. From noon of the 8th it seems to have moved eastward and it was probably only a depression of little importance; but we do not have as yet sufficient observations to verify this.

A Balintang Channel typhoon, October 7 to 11.—This typhoon, like the first one, was apparently formed over the Pacific about 300 or 350 miles to the east of central Luzon. Its center was shown by our weather maps at 6 a. m. of the 7th near 127° longitude E. and 15° latitude N. It moved NW. by W., traversing the Balintang Channel on the morning of the 9th and reaching the China coast between Swatow and Hongkong in the afternoon of the 10th. It was apparently only an ordinary typhoon and not a destructive one, like the first Philippine typhoon of this month.

A Pacific typhoon between Yap and Guam, October 6 to 9.—Although the track of this typhoon is not so certain, as it is based only on the observations made in Guam and Yap, yet it would seem that it formed on October 6 near 142° longitude E. and 9° latitude N. It moved NNW. on the 6th and N. on the 7th and finally it recurved to ENE. on the 8th between 138° and 139° longitude E., 12° and 13° latitude N.

A depression over the Visayas, October 19.—Signs of a depression or typhoon over the Pacific east of the Visayas appeared in the afternoon of the 18th, although the 6 a. m. weather map of October 19 showed clearly that there was only a shallow depression of little importance crossing the southern part of the Visayas in a westerly direction. In the China Sea it moved to WNW., at the same time developing into a real typhoon, which reached the Indochina coast in the early morning of the 23d near 109° longitude E., 14° latitude N.